Governor's Office of Emergency Services

Preliminary Internal Review

June 14, 2005 Tsunami Warning
M7.2 Gorda Plate Earthquake offshore of Humboldt County

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Governor's Office of Emergency Services

PRELIMINARY INTERNAL REVIEW
June 14, 2005 Tsunami Warning
M7.2 Gorda Plate Earthquake off the shore of Humboldt County

Introduction

The purpose of this report is to present a preliminary internal review of Governor's Office of Emergency Services (OES) actions associated with the response to the Tsunami Warning of June 14, 2005, relative to the magnitude 7.2 Gorda Plate earthquake off the shore of Humboldt County. Additional or supplemental reports will be developed if Significant new information becomes available, or further analysis warrants significant changes to the findings in this report. This earthquake occurred at 1951 hours, was approximately 100 miles off the coast of Humboldt County, and resulted in the issuance of a tsunami warning from the West Coast and Alaska Tsunami Warning Center (WC/ATWC).

Table of Contents

The topic areas for discussion are listed in the table of contents below.

I. EXECUTIVE SUMMARY

Background

On June 14, 2005, an earthquake occurred approximately 100 miles off the coast of Humboldt County. There was some probability that a tsunami wave would be generated. As a result, the National Oceanic and Atmospheric Administration (NOAA), through the West Coast and Alaska Tsunami Warning Center (WC/ATWC), issued a tsunami warning to the California State Warning Center (CSWC).

The CSWC is the state's primary center for all emergency alerts and warnings including earthquakes, nuclear power plant incidents, and hazardous material spills. The CSWC has multiple communication methods for contacting local and state government emergency agencies that are directly responsible for the safety of people living in all 58 counties.

Communication Systems Used

The California Warning System (CALWAS), California Law Enforcement Telecommunications System (CLETS), and the Emergency Digital Information Service (EDIS) were all used to contact local emergency responders. Each of these systems is tested and / or used multiple times per day, and were tested before and after this tsunami warning.

Systems Tests

All before and after systems tests indicated that the systems were fully operational at the time of the tsunami. In addition, many coastal communities were alerted to the tsunami by their participation in the California Integrated Seismic Network (CISN) that relays nearly real-time information of earthquake activities.

Initial Notification

Immediately upon receipt of the Tsunami Warning from NOAA, the CSWC relayed the message automatically via CLETS. Within approximately seven minutes of receiving the Tsunami Warning from NOAA, the CSWC had issued its initial notification to coastal county local emergency responders through CALWAS. CSWC staff was augmented from two to four staff within 25 minutes of the event to handle the surge in communications traffic.

Parallel Communication

In parallel to the communications with local emergency responders, OES duty officers for law enforcement, fire, and other disciplines were notified pursuant to procedures. These duty officers had some difficulty making initial contacts with local government emergency management officials in Del Norte and Humboldt Counties because of overloaded local phone systems.

Expansion of Dialogic

This problem should be addressed by the expansion of the existing OES Dialogic notification system that will be programmed to contact local emergency manager pagers, cell phones, and other electronic devices when it is fully operational in October 2005.

Tsunami Warning

The Tsunami Warning issued by NOAA contained language and format that was unclear or obscured critical information. CSWC actions were appropriate, but these NOAA messages may have confused local government responders. OES has raised this issue with NOAA and will seek a change in the warning message content.

There was also message or coding confusion for the NOAA Hazard Radio system and with the Emergency Alert System (EAS), which are used to alert the public, but not emergency officials (both systems are outside the purview of OES).

Local and state Government Responsibility

Local governments have primary responsibility for preparing their communities for a tsunami, including the notification of residents and initiating evacuations, if warranted. The state has responsibility for assisting in local emergency preparedness and coordinating planning between local governments and the state.

OES is also responsible for coordinating state government's response to emergencies and any mutual aid between jurisdictions. OES has provided tsunami-specific emergency planning guidance and training to local government, as well as information about potential tsunami inundation areas.

Resources

Adequate resources at both the local and state government levels are needed to advance tsunami emergency readiness. In the future, OES will be providing additional tsunami planning courses and workshops for local government.

Actions

OES has initiated several actions to address areas for improvement relative to the tsunami response. In addition to the enhancement of Dialogic, OES has already begun communication with NOAA to improve their notification system.

At the earliest possible time in July, OES will convene a Tsunami Summit of the coastal counties to address alert and warning and other preparedness issues and proactively identify areas for improvement. OES will also be hosting, with local government, an exercise in September at the annual California Emergency Services Association (CESA) Conference to be held in San Diego, California, to review the tsunami alerting system. OES is working with the California Geological Survey (CGS) to host a scientific meeting in September 2005 to ensure better understanding of tsunamis in California.

II. EVENT DESCRIPTION

Introduction

On June 14, 2005, at 1951 hours an earthquake with a Preliminary Magnitude of 7.4 (M7.4) (Attachment 2) occurred approximately 100 miles off the coast of Humboldt County. The earthquake exceeded the M 7.0 default level that has been established for triggering the immediate issuance of a Tsunami Warning. This section of the report summarizes the emergency management activities including notifications, interagency coordination, and initial response actions taken by OES, local government, and private utilities in response to the earthquake and tsunami warning**.**

The sequence of activities noted in this report is as recorded by the CSWC and the cadre of multidiscipline on-call duty officers that support state OES 24 hours a day, 7 days a week. It should be noted that the full spectrum of emergency notification and response actions taken by federal, state, and local governmental and private utilities are not captured in this report at this time. (Attachment 3: Timeline of events).

Initial Display of Earthquake on California Integrated Seismic Network (CISN)

Approximately one minute after the event, the location of the earthquake was displayed over CISN on the Internet. The magnitude was posted roughly five minutes after the event and was simultaneous with the issuance of the Tsunami Warning from NOAA.

First California Warning System (CALWAS) Notice of Earthquake

At 1953 hours the CSWC was advised by Humboldt County over the CALWAS communication system that the earthquake was felt and that there were no reports of damage or injuries.

Earthquake & Tsunami Warning

The CSWC received two Bulletins # 1--one from each of the two Tsunami Warning Centers—the West Coast and Alaska Tsunami Warning Center (WC/ATWC) Palmer, AK, and the Pacific Tsunami Warning Center (PTWC) in Ewa Beach, HI.

As the CSWC was preparing to issue earthquake notifications, at 1957 hours, the WC/ATWC issued a Tsunami Warning as follows:

TITLED BULLETIN #1

"A TSUNAMI WARNING IS IN EFFECT FOR THE COASTAL AREAS FROM THE CALIFORNIA-MEXICO BORDER TO THE NORTH TIP OF VANCOUVER I.- BC. INCLUSIVE."

Wave Arrival Times

The Warning had been transmitted electronically using the CLETS tsunami group (which includes 22 counties, CHP, and State Parks and Recreation) and EDIS. WC/ATWC Bulletin #1 identified possible tsunami wave arrival times along the California coast. A sample of wave arrival time along the California coast are below: (See Attachment 4: Bulletin #1 from WC/ATWC).

Crescent City	2029 PDT
San Francisco	2123 PDT
San Pedro	2200 PDT
La Jolla	2214 PDT

At 1959 hours the WC/ATWC called the CSWC to confirm OES' receipt of the message.

PTWC Bulletin #1

At 2000 hours, approximately three minutes after receiving the WC/ATWC Bulletin #1, Tsunami Warning, the CSWC received a Tsunami Bulletin #1 (Attachment 5) from the Pacific Tsunami Warning Center (PTWC) that stated:

"THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT ALASKA-BRITISH COLUMBIA-WASHINGTON-OREGON-CALIFORNIA.
TSUNAMI INFORMATION BULLETIN
THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING OR WATCH IN EFFECT."

NAWAS Call

At 2003 hours, the National Warning Center conducted a National Warning System (NAWAS) call in which the WC/ATWC read their Tsunami Warning message verbatim to the states of Washington, Oregon, and California.

CSWC Transmits Tsunami Warning Notification
By 2004 hours, (7 minutes after official notification from WC/ATWC), the CSWC had transmitted the Tsunami Warning verbally to coastal counties and Sacramento California Highway Patrol (CHP) using the CALWAS.

Emergency Alert System Activated
The four coastal National Weather Service (NWS) offices (Eureka, Monterey, Oxnard and San Diego) activated the EAS Tsunami Warnings as per NOAA procedures. The CSWC manager confirmed this activation on the afternoon following the event.

Notification of OES Duty Key Executive Staff
By 2010 hours the CSWC had completed initial briefs with OES Coastal Regional Administrator, and earthquake/tsunami specialist. By 2012 hours the CSWC completed pager notification to the OES Director, Chief Deputy Director, and all OES Duty Officers. All of the above also had received the earthquake notification and tsunami warning by EDIS as well.

CSWC Increases Staffing

To address the extremely large volume of CSWC incoming phone calls and requisite notifications, the CSWC staffing was increased from two to four staff within 25 minutes of the official Tsunami Warning notification. CHP officers, co-located in the CSWC, assisted by answering telephones.

State Duty Officer Call

State OES Duty Officer Internal Conference Calls

At 2013 hours, the OES Executive Duty Officer confirmed receipt of CSWC initial page and directed the CSWC to page all OES Duty Officers, the OES Director, OES Chief Deputy Director, and the Coastal Regional Administrator to advise them that there would be a duty officer conference call at 2025 hours to address the earthquake and tsunami response.

At 2025 hours, the state OES duty officer conference call was facilitated by the OES Executive Duty Officer (EDO). The EDO instructed the other duty officers to make positive contact with their local government counterparts to acquire situation status, including intelligence on damage and injuries. The duty officers were advised forward any significant information directly to the CSWC and that a follow-up conference call would be convened at 2130 hours.

NPP Notification

Nuclear Power Plant Notification

At 2105 hours, Diablo Canyon Power Plant (DCPP) declared an Unusual Event (the lowest emergency classification level used by nuclear power plants when an event could indicate a potential degradation of plant safety). The Unusual Event was tied to the tsunami warning that was issued. At 2145 hours the plant cancelled the unusual event and went to normal operations. As a result, the CSWC notified primary state and local agents of the DCPP Unusual Event Cancellation.

Tsunami Warning Cancelled

Tsunami Warning Cancelled

At 2109 hours, the CSWC received a second bulletin (Attachment 6: Bulletin #2) from the WC/ATWC, which cancelled the tsunami warning when it had been confirmed that a tsunami had not been generated by the earthquake. At 2111 hours the CSWC transmitted notification of the Tsunami Warning cancellation verbally to all coastal counties over the CALWAS and the tsunami group over CLETS.

Second DO Call

Second Duty Officer Internal Conference Call

At 2130 hours, a second state OES duty officer conference call was facilitated by the state OES EDO. During the conference call a situation update was provided by each of the duty officers. In addition to all state duty officers, the conference call was attended by the OES Chief Deputy Director, a Deputy Director, the Coastal Regional Administrator, OES Chief of Fire and Rescue, and a representative from the California Geological Survey (CGS). Significant intelligence findings on the call included:

1) Confirmation that duty officers made positive contact with all Coastal counties.
2) Confirmation that there were no reports of damage or injuries.
3) Confirmation that local law enforcement and fire districts had initiated evacuation efforts of low-lying areas in Del Norte County (including Crescent City), and Humboldt County. These local evacuation activities halted once it was learned that the Tsunami Warning had been cancelled.

Initial Reports No Damage or Injuries

Despite the significant magnitude of this earthquake, only a 9" non-damaging tsunami was generated, and there were no reports from local government of damages or injuries.

Pipeline Precautionary Measures

At 2145 hours, the Kinder Morgan Company advised the CSWC that they had shut down several pipelines as a precaution at 2100 hours. After inspections were conducted all pipelines were restarted at 2359 hours.

Aftershock Notification

In the days immediately following the earthquake, there were aftershocks measuring up to M6.7. The aftershocks did not trigger a tsunami warning or watch and there were no reports of damage or injuries. The WC/ATWC issued INFORMATION BULLETINS for 5 earthquake events as small as M4 after the Mw7.2.

EOC Activations

Emergency Operations Center (EOC) Activations

The following EOCs were activated for a short period of time in support of response to the earthquake and tsunami warning:

1) San Luis Obispo Operational Area Emergency Operations Center
2) OES' Southern Regional Emergency Operations Center
3) State Operations Center
4) San Mateo Operational Area Emergency Operations Center

III. FOCUS AREAS: Background, Analysis, Findings, and Actions

Based upon the events of June 14, 2005, regarding the tsunami warnings issued by the WC/ATWC and the PTWC, OES has focused this review on the following key areas as they relate to the tsunami warning and response.

1. State Notification Systems
2. State Notification Processes
3. Federal Notification Systems
4. Tsunami Preparedness.

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1. STATE NOTIFICATIONS SYSTEMS

CSWC

California State Warning Center (CSWC)

✓ The Governor's Office of Emergency Services oversees the CSWC. The CSWC is staffed 24 hours a day, seven days a week.

Its primary function is to provide emergency communications with government county emergency-first responder agencies. It can also provide emergency communications with other pre-identified government and private agencies at various levels.

It is equipped with a number of telephone, data, and radio systems, including the CALWAS, CLETS, NWS Weather Wire, CSWC message switching computer, EDIS, CISN, and Dialogic paging, all of which are described in more detail later in this document. Most of these systems are used on a day-to-day basis; others are available for use in an emergency, as conditions require.

✓ Standard Operating Procedures (SOPs) for the CSWC have been established for specific incidents including, but not limited to earthquakes, tsunamis (seismic sea waves), hazardous material spills, floods, radiological incidents, power emergencies, nuclear incidents, foreign animal disease, major fires, missing and overdue aircraft, runaway trains, terrorism threat, dam failures.

✓ Hazardous material spills in California are reported to the CSWC, which receives an average of 900 spill calls per month. Each report received is reported to the California

Department of Fish and Game, the U.S.Environmental Protection Agency, the local administrative agency, the Department of Toxic Substances Control, the Regional Water Quality Control Board, and the U.S. Fish and Wildlife Service. CSWC notifications may include ten or more agencies, depending on the size, location, populace, and environment affected.

- ✓ The CSWC provides local and state agencies with a broad range of information, including precipitation forecasts, flood information, winter road information, and radioactive fallout wind data. It is the State Coordinating Point for Air Force Rescue and Coordination Center regarding downed, missing, or overdue aircraft and missing or lost individuals.

- ✓ During non-office hours, the CSWC acts as the emergency answering point for the State Department of Health Services, Department of Toxic Substances Control, California Department of Food and Agriculture, and the Emergency Medical Services Authority.

BACKGROUND

The CSWC uses a number of tools to communicate with federal agencies, state agencies, and local government. The primary tools used during all emergencies are described below.

NAWAS/CALWAS

National Warning System (NAWAS)/California Warning System (CALWAS)

NAWAS and CALWAS were developed by the Federal Government. This two-way communication system consists of "push to talk" phones which are on an open bridge line enabling 63 warning points (to include all coastal counties) to hear a transmission concurrently. To initiate a call, the State Warning Point (CSWC):

- ✓ Depresses a button, which causes an audible alert tone (whether the phone is turned down or not) and a red light on the phone to come on at the warning point.
- ✓ The message announcement is "All stations standby for message, all stations standby for message."

NAWAS/CALWAS

- ✓ The message is then announced and stations are then polled to determine if the message was received and understood.
- ✓ If a CLETS message was sent concurrently with the announcement, verification of receipt of the CLETS message is also determined. If the CLETS message was not received, it is faxed to the county.

The system was developed primarily to rapidly notify emergency personnel in federal agencies, states, and counties of foreign missile launches or an impending attack on the nation. While this capability still exists, CALWAS has been expanded to an all-hazards notification system to emergency personnel to support rapid and effective response to natural and technological disasters.

On the national side of the circuit there are over 1,800 agencies connected. Federal agencies such as the White House Communications Agency, U.S, Nuclear Regulatory Commission, Environmental Protection Agency, U.S. Coast Guard, Department of Defense, and the Tsunami Warning Centers are on the circuit. All 24-hour warning points for every state are also on the circuit

CALWAS is now used primarily to relay time critical information to a county or counties such as Watches or Warnings for tsunamis, flash floods, or tornadoes, as well as earthquake advisories, and notifications for runaway trains to the County Warning Points.

The CSWC can activate CALWAS at anytime for California's counties, State OES facilities in Oakland and Los Alamitos; Douglas County, Nevada (provides service for Alpine County during times that the Alpine dispatch center is not staffed); the six NWS offices covering California, the federal Department of Energy (Livermore); and CHP in Sacramento, which serves as backup to the CSWC. CALWAS equipment is installed in a 24-hour dispatch or notification center at each of these sites.

CLETS

California Law Enforcement Telecommunications System (**CLETS)**

- ✓ CLETS is a computer-based information retrieval and relay system administered by the California Department of Justice. The system issues bulletins and provides law enforcement agencies with sensitive information. This is a unique intranet system, which is used not only for law enforcement activities but also is used by OES to transmit watches, warnings, weather, and other critical information to federal, state, and local agencies.

- ✓ OES maintains its own sets of unique notification groupings, which contain federal, state, county, and city unique mnemonics (identifiers). Groupings allow weather, tsunami watches or warnings, and other critical information such as missing aircraft warnings to be sent to specific geographic areas quickly and securely.

- ✓ While most weather information has been programmed to be automatically sent out once received from the NWS, protocols and procedures are in place so the CSWC can create a message and direct it to the appropriate agencies. Examples of this are notifications of the possibility of blackouts in specific regions because of energy shortages.

Systems that interface with CLETS through OES are the NWS Weather Wire and EDIS.

NWS Weather Wire

National Weather Service Weather Wire

This system is maintained by the NWS and interfaces with the CSWC message switching computer, both by satellite and the internet. Messages received over the weather wire include but are not limited to watches and warnings for tsunamis, tornadoes, flash floods, earthquake advisories, and severe weather statements. These messages go into the OES CSWC message switching computer for further processing and dissemination over CLETS and EDIS.

EDIS

Emergency Digital Information Service (EDIS)

- ✓ EDIS is an OES-provided service, developed in response to a Legislative mandate following the 1989 Loma Prieta Earthquake, as a method to assist the media in providing messages visually to the hearing impaired.

- ✓ EDIS gives authorized Government and Critical Infrastructure agencies ("originators") a conduit for the distribution of warning and Emergency Public Information content (such as evacuation areas, sheltering information, pictures of abducted children that are the subjects of ongoing AMBER alerts, etc.) to the media and to the public.

- ✓ Originators may access the system by dial-up modem, the Internet (using a Web page), the CLETS, or via the NOAA satellite network. Originators may provide text messages, sound files, or images for distribution.

- ✓ The text messages, sound files, and images are available for viewing on the EDIS Web site (http://www.edis.ca.gov). In addition, the test messages are distributed over the Internet, on text pagers, by satellite and by data radio transmitters to the media and volunteer third-party distributors.

- ✓ The public may receive EDIS messages via e-mail, text messaging, or pager by directly contacting one of the voluntary third-party distributors (a list [including contact information] is on the EDIS Web site), or by visiting the OES Web site.

CISN

California Integrated Seismic Network (CISN)

The California Integrated Seismic Network, launched in 2002, is a statewide network that provides the basic information for California earthquakes shown on the CISN Display. The CISN Display is an Internet-based rapid earthquake notification system that has been available as a software download from the Internet since January 2005.

CISN

The CISN Display also receives earthquake information from networks world-wide and now provides notification for earthquakes globally.

To ensure that the system can provide adequate service to its users, access to CISN Display is currently limited to the following communities:

- ✓ Local, State, and Federal agencies with emergency response and recovery functions
- ✓ Critical lifeline and infrastructure operators (e.g., power, rail, water, etc.)
- ✓ News media outlets
- ✓ Seismic network operators
- ✓ and other organizations that receive CISN earthquake notification by pagers

Registered Users

Priority for transfer of the CISN Display is to local emergency managers. Following is a list of organizations located in coastal California or with earthquake/tsunami response roles that have registered as users of the CISN Display:

City and County

- City and County of San Francisco, Office of Emergency Services

City

- City of Long Beach
- City of Los Angeles
- City of Oxnard
- City of Pacifica
- City of Torrance, OES
- Long Beach Fire Department
- Oxnard Fire
- City of Santa Monica, Emergency Management

County

- Alameda County Emergency Medical Services Agency
- Los Angeles County Fire
- Los Angeles County, Office of Emergency Management
- Los Angeles County Sheriff's Communications Center
- Los Angeles County Sheriffs Department
- Marin County OES
- Monterey County OES
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Registered Users

- San Luis Obispo County OES
- Santa Cruz County OES
- San Mateo County Sheriff's Office, OES
- Solano County OES
- Sonoma County OES
- Ventura County Sheriff's OES
- Orange County Operational Area
- Orange County -Resources & Development Management Department/Planning & Development Services Division

Special Districts
- Los Angeles Department of Water and Power
- Orange County Sanitation District
- Port of Los Angeles
- Water Emergency Response Organization of Orange County

State
- California Coastal Commission
- California Geological Survey
- California Department of Transportation - District 5
- California Department of Transportation - District 7
- California Department of Transportation - Research & Innovation
- California Seismic Safety Commission
- California State University, East Bay
- California State University, Long Beach Police Department

Federal
- Department of Health and Human Services, Office of Public Health Emergency Preparedness, Region IX
- National Weather Service - San Francisco

Private
- American Red Cross of Greater Los Angeles

Dialogic

Dialogic

Dialogic is an automated call system used by the CSWC to make small-scale notifications, such as to federal and state response teams for nuclear power plant incidents.

Based on the performance of state warning communications systems described above, the analysis of their performance follows.

ANALYSIS

- ✓ Based on a review of system tests conducted during the day of June 14, 2005, and on previous days, all available systems listed above were fully operational and functioning during this event. On the subsequent day, systems also tested fully functional.

- ✓ Transmission of messages and information occurred over CALWAS, CLETS, EDIS, and CISN. Dialogic, as currently configured, was not used, as it was not necessary to notify OES staff in general. Per SOPs, OES Duty Officer notifications were accomplished using the paging system.

- ✓ Currently CSWC alert and warning notification messages that are transmitted via CALWAS and CLETS go from the CSWC as follows:

  CALWAS to county warning points only;
  CLETS to county warning points and other 24-hour dispatch centers.

- ✓ The county emergency responder dispatch centers and warning points must then follow their established plans, procedures, and protocols to make notifications to local officials.

FINDINGS

- ✓ OES should continue to promote the use of CALWAS and CLETS to provide time-critical information to local warning points. CALWAS and CLETS complement each other as redundant systems.

- ✓ OES should continue to promote the use of CISN Display and subscription to earthquake and tsunami notifications to provide time-critical information to local managers and decision makers.

- ✓ There is not currently in place an alert and warning notification system that transmits messages directly from the CSWC to local emergency services officials, e.g. local OES managers. OES should implement an automated, all-hazards notification system that would provide notification to local and state agencies by upgrading the Dialogic technology that is currently used for small-scale incidents. This will also provide a third redundancy in the notification process.

ACTIONS

- ✓ The CSWC is currently upgrading its current automated call system (Dialogic). The upgraded system will be capable of performing 1,000 one-minute calls in 21 minutes or 2,000 thirty-second calls in 21 minutes. The CSWC will also have the capability to use the Dialogic facility in Tennessee to substantially increase the notification capacity and will provide the CSWC with remote offsite backup/redundancy. In addition, the upgraded system will be able to better notify local emergency services officials.

2. STATE NOTIFICATION PROCESSES

BACKGROUND

The CSWC has established SOPs for immediately notifying federal, state, and local emergency personnel and OES DOs of several types of incidents including earthquakes and tsunami. These SOPs are established as guidance for the CSWC controllers during the initial notification phase of an emergency. The CSWC SOP's delineate thresholds and methods for transmitting notifications.

CSWC has SOPs for notifying local emergency personnel and OES DOs. In addition to an Executive Duty Officer, OES has a duty officer for each of its three Regions, and for its specific disciplines—Fire, Law Enforcement, Information Technology, Telecommunications, and Public Information.

As noted earlier, the CALWAS, CLETS, and the EDIS were all used to contact local emergency responders. Each of these systems is tested and / or used multiple times per day, and were tested before and after the tsunami event.

ANALYSIS

On the evening of June 14th, the CSWC followed established SOPs to contact County Warning Points. However, due to the volume of phone calls, the CSWC did not log calls for CALWAS as outlined in SOPs. The following describes the CSWC actions taken regarding SOP implementation on the night of June 14th:

- ✓ Upon notice of the June 14th, M7.2 earthquake off the coast of Humboldt County, the CSWC immediately commenced implementation of the CSWC SOP for Earthquakes exceeding M4.5.

- ✓ Minutes after being notified of the earthquake, the CSWC received the WC/ATWC Bulletin #1 Tsunami Warning.

- ✓ Based on the critical time sensitivity of transmitting the Tsunami Warning to the affected coastal counties, the CSWC ceased implementing the Earthquake Notification SOP and began implementing the Tsunami Warning Notification SOP. This action was taken to expedite emergency notification to the coastal counties so they could commence emergency response measures to

- ✓ protect lives in the low-lying coastal areas. Reinforcing this decision to place tsunami, as highest priority was the fact that the CSWC had received immediate reports from the counties closest to the epicenter of the earthquake that there were no reported damages or injuries.

- ✓ Due to the extreme volume of calls during the first 15 minutes of the earthquake and tsunami warning, it was not possible for the CSWC controllers to keep up with detailed logs of both incoming and outgoing communications as prescribed by SOP.

- ✓ Two additional warning controllers were called in and arrived within 25 minutes of the tsunami warning notification. CHP officers, co-located in the CSWC, assisted by answering telephones. On July 15, 2005, CHP staff will relocate to CHP Headquarters, which will reduce OES' capabilities in the CSWC.

Communication Infrastructure

Communication Infrastructure

OES duty officers perform parallel communication to emergency management officials as routine practice during significant alerts and warnings. OES duty officers reported that a number of local governments were experiencing busy telephone lines and overloaded circuits. As a result, the OES duty officers were initially unable to make positive contact with the local governments.

FINDINGS

CSWC staff did not complete CALWAS call-down logs per SOPs .

Regional Duty Officers (RDOs) were not able to complete phone contact with all potentially affected OAs.

ACTIONS

- ✓ CSWC staff has reviewed and been re-trained on the tsunami SOP. OES is taking steps to ensure that CSWC staff review and are re-trained in all other SOPs.
- ✓ OES is also recording NAWAS and CALWAS as a redundancy.
- ✓ OES will develop and reinforce SOPs and training for the DO cadre on requesting additional assistance and alternative contact mechanisms and protocols.

3. FEDERAL NOTIFICATION SYSTEMS

BACKGROUND

WC/ATWC

NOAA's West Coast and Alaska Tsunami Warning Center

The NOAA National Weather Service operates two tsunamis Warning Centers—one each in Alaska and Hawaii. The WC/ATWC, located in Palmer, Alaska, has the sole responsibility for issuing tsunami warnings to coastal locations of California, Oregon, Washington, British Columbia, and Alaska—its area of responsibility (AOR).

For further description of the WC/ATWC and the Pacific Tsunami Warning Center (PTWC) in Hawaii, please see attachment 7.

EAS

Emergency Alert System (EAS)

- ✓ EAS is a nationwide alert and warning system using volunteer media broadcasters and is federally administered. It is an automatic text and audio messaging system using special encoder/decoder devices attached to local radio/TV and cable transmitters.

- ✓ Alert and warnings for the public "to take action" can be transmitted by authorized federal, state, or local public safety officials to established LP1s (local primary) broadcasters.

- ✓ Broadcasters have voluntarily agreed to send some types of emergency messages automatically, which are applicable to the area, such as tsunami warnings or watches along the California Coast.

- ✓ Media staff must review other types of messages before they release the message and interrupt broadcasting. Universal header codes approved by the Federal Communications Commission (FCC) have been established to identify the types of messages.

- ✓ Under the EAS Program, each state has a State Emergency Communications Committee (SECC),

EAS

consisting of radio, television, and cable system operators, along with representative of the NWS.

- ✓ SECCs are encouraged to include state emergency management in the committee makeup. The SECC designates local planning areas, each with a Local Emergency Communications Committee (LECC) to develop and maintain a plan and to designate one or more LP broadcast stations in the area.

- ✓ The LECCs mirror the SECC as far as committee makeup, including the suggestion that emergency managers be included. The local NWS office(s), the SECC, and the FCC approve local plans.

- ✓ Within California, OES participates in the California SECC, serving as the Executive Secretary. There are 23 Local Areas, most with local emergency managers and the CHP as members.

- ✓ Participating broadcasters monitor the plan-designated Primary broadcast station, the local NOAA Weather Radio (NWR) transmitter (in those areas where a NWR station exists), and may monitor a locally designated radio circuit for the input of local warning messages.

- ✓ Warning Messages received by a broadcaster may be forwarded directly, or voiced by a local announcer, at the individual station's discretion.

NOAA Weather Radio

This is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby NWS office. NWR broadcasts NWS warnings, watches, forecasts and other hazard information 24 hours a day. NWR also broadcasts warning and post-event information for all types of hazards—both natural (such as earthquakes and volcano activity) and environmental (such as chemical releases or oil spills).

ANALYSIS

- ✓ During the June 14th event, there was confusion when the WC/ATWC issued a Tsunami Warning – Bulletin #1, and the PTWC also issued a Bulletin #1 that included the wording “no warning exists except Alaska, British Columbia, Washington, Oregon and California. “

  The CSWC correctly responded to only the WC/ATWC Warning, but many local government and media assumed that the second to arrive, the Bulletin from PTWC, superseded or cancelled the Warning.

- ✓ The use by NOAA of two different formats--the use of all caps teletype format and the extensive headers--obscured the critical information. At NOAA’s request, OES Earthquake and Tsunami Program staff provided comments in 2003 on Tsunami Warning Center message content and format. Comments included: difficulty in reading messages, e.g., all caps; inclusion of codes and other extraneous content that are irrelevant to the message; the most important message content is buried in the message; and, in general, the messages were not user-friendly. OES’ recommended changes have not been implemented.

- ✓ At the June 21, 2005, National Academy Roundtable on Tsunami Preparedness, it was reported that the media and public receive Tsunami Warnings simultaneously with local government. OES’ presentation to the Academy cited the following: the Warning Message formats of PTWC and WC/ATWC are neither consistent nor reader-friendly and resulted in confusion. The graphics available from WC/ATWC did not assist recipients in understanding the Warning.

FINDINGS

- ✓ The use by the NOAA of two different formats--the use of all caps teletype format and the extensive headers--obscured the critical information. NOAA needs to consistently format their bulletins, watches, and warnings for clarity of understanding.

ACTIONS

- ✓ California OES, as a participant in the NTHMP, has, with the States of Washington and Oregon, initiated discussions with NOAA, the NWS, and both the WC/ATWC and PTWC to take corrective actions.

- ✓ In addition, OES will convene in July a Tsunami Summit with the coastal counties to review state and local procedures, promote the use of warning communication technologies including CISN Display, Weather Wire, EDIS, brief on the implementation of Dialogic technologies and to identify training needs and opportunities.

- ✓ OES and NOAA / NWS will hold a joint tsunami tabletop exercise at the annual CESA conference in San Diego on September 26, 2005.

- ✓ OES secured funding from NOAA, in order for CGS to convene a three-day scientific and technical meeting in September 2005, to discuss tsunamigenic sources and current scientific understanding of tsunamis that could impact California.

- ✓ For "near source tsunamis" the WC/ATWC needs to provide specific information to assist local decision makers.

4. TSUNAMI PREPAREDNESS

BACKGROUND

Local Planning

Overall Local Government Emergency Planning
California Government Code Section 8610 (a portion of the Emergency Services Act--ESA) provides that "Counties, cities and counties, and cities may create disaster councils by ordinance. A disaster council shall develop plans for meeting any condition constituting a local emergency or state of emergency. . ."

State Planning

Overall State Government Emergency Planning
The State develops and promulgates the California State Emergency Plan, which is in support of local government. The State directs the actions of state agencies to support local government. As part of its mission to ensure the state is ready and able to mitigate against, prepare for, respond to, and recover from the effects of emergencies that threaten lives, property, and the environment, the State develops and issues plans, procedures, and protocols to support emergency preparedness efforts.

Guidance

Local Planning Guidance on Tsunami Response (Guidance)
In 1997, coastal counties and membership of the California Tsunami Steering Committee participated in the development and review of the *Local Planning Guidance on Tsunami Response* (first published in 1997, revised in 2000). In the intervening years, OES Coastal and Southern Regions have distributed the document at Mutual Aid Regional Advisory Committee meetings and other opportunities to promote the initiation of tsunami preparedness. The *Guidance* was again distributed at the 2004 Burlingame, CA, workshop for local government as one tool to assist local preparedness and utilization of tsunami inundation projections.

Notification and Evacuation

Critical elements of local plans include notification from the CSWC, public notification, and evacuation planning. It is important to note that the responsibility for developing and implementing evacuation plans rests with local government. For more detail on notification and evacuation planning,

please refer to the *Guidance*. In addition, attached to the *Guidance* is a document entitled *Legal Guidelines for Controlling Movement of People and Property During an Emergency* that provides more detail.

Distribution of Guidance

OES continues to distribute and use the *Guidance* in workshops, seminars, and in developing presentations to promote local tsunami planning. Several hundred copies of *Guidance* have been distributed to coastal OAs since 2001, and the *Guidance* is posted on the OES web site. The document is intended to assist local governments in the initial development of a tsunami response plan and the procedures necessary to deal with a tsunami's impact on their communities.

Inundation Projections

Inundation Projections

- ✓ To date, OES has with available funding provided inundation projections [maps] to nine coastal counties--San Diego, Orange, Los Angeles (except for the LA and Long Beach Harbor areas), Ventura, Santa Barbara, Monterey, Santa Cruz, San Mateo, and San Francisco. The remaining six maps will be delivered by the end of this year to San Luis Obispo, Marin, Sonoma, Mendocino, Humboldt, and Del Norte. The priority for mapping was based on population; that is, the number of people at risk.

- ✓ There are also a few gaps including an area south of San Diego Bay that includes Imperial Beach, an area north of Oceanside, the Palos Verdes Peninsula, the Ports of Los Angeles and Long Beach, coastal bluffs in northern Santa Barbara County near Gaviota and bluff area in Monterey and Santa Cruz counties.

- ✓ OES' Geographic Information Systems (GIS) Unit uses tsunami inundation projections from the University of Southern California to produce the tsunami inundation maps that are given to counties. The OES GIS unit has been available to adapt inundation projections to local evacuation maps.

- ✓ Inundation projections for Crescent City and Humboldt Bay are included in the 1995 CGS publication "Planning Scenario in Humboldt and Del Norte Counties, California, for a Great Earthquake on the Cascadia Subduction Zone."

Tsunami Class

CSTI Training Course

Following the December 26, 2004, Southern Asia tsunami disaster, OES quickly developed tsunami planning workshops and seminars for local jurisdictions. Already under development at the time of the December 2004 tsunami, OES held a three-day seminar entitled "Tsunami Planning for Coastal Communities," at the CSTI in April 2005. The total enrollment was 35 from the agencies listed below.

City and County
- San Francisco OES

City
- Daly City North County Fire
- Fountain Valley Municipal Water District
- Huntington Beach Police Department
- City of Imperial Beach
- City of Los Angeles
- City of Oxnard
- City of Oxnard Wastewater Division
- Oxnard Fire Department.
- Pacifica Police Department.
- Pacific Grove Fire Department.
- Pismo Beach Police Department.
- Santa Barbara Police Department.
- Torrance Police Department.

County
- Marin County OES
- Monterey Co. OES
- Orange Co. Sheriff's Department.
- San Luis Obispo Co. Fire Department.
- San Luis Obispo Co. OES
- San Mateo Co. OES
- Ventura Co. Sheriff's OES

Special District
- Fountain Valley Sanitation District

Federal
- Oxnard National Weather Service

State
- California Department of Transportation - Orange County
- California Department of Transportation - Irvine
- State OES
- OES Coastal Region

Course Highlights

Highlights of the agenda included:
- State of California Role in Planning
- Local Planning
- Warning Generation and Protocol: From the NOAA Tsunami Warning Center*s* to the PSAPs
- Building a Local Plan.

One-day Workshops

As a follow-up to the CSTI course, OES will be conducting one-day tsunami workshops in each coastal county (15), beginning with Ventura in July, with San Diego and San Mateo to follow.

OES Workshops

OES Workshops

OES has been actively engaged in tsunami planning and technical assistance to local governments since 1992, in the aftermath of the Petrolia Earthquake. OES has conducted

Training Workshops in 1998, 2000, and 2004 with local government emergency managers and representatives of state agencies on the following topics:

- The Tsunami Threat
- Tsunami Inundation Mapping
- Developing Evacuation Plans
- Public Information and Education on Tsunami
- National and State Alert and notification Systems
- Alert and Warning Technologies

Burlingame Workshop

At the request of coastal counties, OES hosted a workshop for all coastal counties in Burlingame, CA, on November 30-Dececember 2, 2004. This workshop focused on alert and

warning technologies and tsunami planning and served as a template to plan further workshops. The counties represented at the workshop included: Orange, Los Angeles, Ventura, Monterey, San Mateo, San Francisco, Marin, Sonoma, Mendocino, Humboldt, and Del Norte.

Agenda

The agenda highlighted the following areas.

- ✓ **Warning and Notification Process** to include the notification process from the issuance of a watch/warning by the WC/ATWC to its receipt by the CSWC and dissemination to the operational areas and cities.
- ✓ **Equipment for Notification and Warning Dissemination** to address audible alerting equipment and signage in an effort to identify desirable qualities in these devices and develop some level of consistency and standardization from one jurisdiction to another.
- ✓ **Planning efforts** at the local level and what steps can be taken to resolve issues, promote continued planning, and support awareness campaigns.

Steering Committees

National and California Tsunami Steering Committees

- ✓ OES and CGS represent California on the Steering Committee of the NTHMP administered by NOAA in partnership with the five states bordering on the Pacific Ocean, NOAA, the Federal Emergency Management Agency (FEMA), the United States Geological Survey, and the National Science Foundation.

- ✓ OES established a California Tsunami Steering Committee to guide activities in the State and set priorities for use of federal funding. The steering committee is comprised of the California Geological Survey, the California Seismic Safety Commission, the Department of Transportation, the Coastal Commission, and the Department of Parks and Recreation, and the 15 coastal counties (Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Francisco, San Mateo, Santa Cruz, Monterey, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Diego.)

- ✓ The priorities of the State's program, established by the Steering Committee, are development of inundation maps for local governments, development of planning guidance, provision of technical assistance from OES GIS personnel, and the development of consistent public information materials. Funding from NOAA has underwritten these activities since 1997 and currently ranges between $88,000 and $274,000 per year.

Local Planning Efforts

Local Government Tsunami Planning Efforts

Some local governments have been engaged in tsunami planning efforts before the 2004 Asia event, and in some cases as early as 1965. In the aftermath of the 1964 Alaska earthquake and Crescent City tsunami, Del Norte, Humboldt, and San Mateo Counties initiated tsunami preparedness efforts. San Mateo County developed a county response plan, SOPs, and notification procedures in both English and Spanish.

- ✓ Review of tsunami inundation maps and procedures, if any, for response to a tsunami warning
- ✓ Attending workshops and seeking planning and technical assistance
- ✓ Creation or revision of local tsunami plans (most jurisdictions have multi-hazard plans that include
- ✓ evacuations; San Mateo County has enacted a stand-alone tsunami plan)
- ✓ Preparation of reports regarding the status of plans for city councils and boards of supervisors

ANALYSIS

- ✓ The *Local Guidance for Tsunami Response* provides the framework for development of local tsunami plans. The *Guidance* also provides specific actions local government can take in response to tsunami notifications.
- ✓ Since 1997 OES has been active in providing training to local government in the use of the *Guidance*.

- ✓ OES participates at both the national and state levels in development of tsunami preparedness materials and disseminating these to local government.

FINDINGS

- ✓ California has shown leadership in the area of tsunami preparedness and will continue to promote local tsunami planning efforts. Since 1997, OES held three training workshops and numerous meetings for coastal county local governments on tsunami issues and in November 2004 hosted a three-day workshop focusing on alert and warning technologies and tsunami planning. The 15 targeted workshops in each coastal county will begin this July. OES also includes a tsunami segment in its CSTI Earthquake course held four times a year, and this past spring offered a course specific to tsunamis

- ✓ The Asian earthquake and tsunami and the recent Gorda Plate earthquake and Tsunami Warning suggest a need

- ✓ for additional training at all levels of government, and will no doubt stimulate interest in planning, preparedness, and community education.

- ✓ California should pursue additional funding sources to bolster and augment additional tsunami preparedness in the state.

- ✓ The only tsunami-specific funding is available from NOAA, and that funding fluctuates with the allocation from the federal budget. There is no specific General Funded-support for tsunami preparedness.

- ✓ In the immediate aftermath of the December, 2004, Sumatra earthquake and tsunami, OES submitted an assessment and statement of resource needs to address the tsunami threat in California. (Attachment 8: 1/19/05 letter to Senator Feinstein).

ACTIONS

- ✓ OES is promoting the recently developed three-day CSTI Tsunami Planning course.
- ✓ OES has developed one-day intensive planning workshops. The first one-day workshop is scheduled for Ventura on July 12. Workshops for San Diego and San Mateo are also in the early planning stages.
- ✓ OES will update and reissue the *Local Tsunami Planning Response Guidance.*
- ✓ At the earliest possible time in July, OES will convene a Tsunami Summit of the coastal counties to address alert and warning and other preparedness issues and proactively identify areas for improvement.

IV. CLOSING

This preliminary internal review of the sequence of events immediately following the June 14th Earthquake and Tsunami Warning has revealed critical emergency management information that would be have been difficult, or perhaps impossible, to reveal from a “staged tsunami exercise.” The incident occurred without warning and during a time of day when federal, state, and local emergency management agencies are normally operating at reduced staffing levels. As such, there were no artificialities that could positively or negatively bias the outcome.

Identification and analysis of specific actions taken, and not taken, by state and local emergency managers in response to the Tsunami Warning has already caused positive institutional change in the way the Governor’s Office of Emergency Services will respond to future incidents of this nature. The need for focused state and local training for responding to a Tsunami has become apparent as a result of this review, and OES is committed to conducting this training as a priority initiative.

Future emergency notification and response coordination system enhancements that will be made because of the “Lessons Learned” from analysis of this real-life, real-time emergency will make California better prepared to quickly and effectively respond to Tsunami Warnings and other major emergencies in the future.

Attachment 1: Acronyms

AOR	Area of Responsibility
CA	California
CALWAS	California Warning System
CESA	California Emergency Services Association
CGS	California Geological Survey
CHP	California Highway Patrol
CISN	California Integrated Seismic Network
CLETS	California Law Enforcement Information Service
CSTI	California Specialist Training Institute
CSWC	California State Warning Center
DCPP	Diablo Canyon Power Plan
EAS	Emergency Alert System
EDIS	Emergency Digital Information Service
EDO	Executive Duty Officer
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
FCC	Federal Communications Commission
GIS	Geographic Information System
LECC	Local Emergency Communications Committee
LP-1	Local Primary (broadcasters)
M	Magnitude
Mw	Moment Magnitude
NAWAS	National Warning System
NOAA	National Oceanic and Atmospheric Administration
NTHMP	National Tsunami Hazard Mitigation Program
NWR	National Weather Radio
NWS	National Weather Service
OA	Operational Area
OES	Office of Emergency Services
PSAP	Public Safety Answering Point
PTWC	Pacific Tsunami Warning Center
SECC	State Emergency Communications Committee

SOP	Standard Operating Procedure
WC/ATWC	West Coast and Alaska Tsunami Warning Center

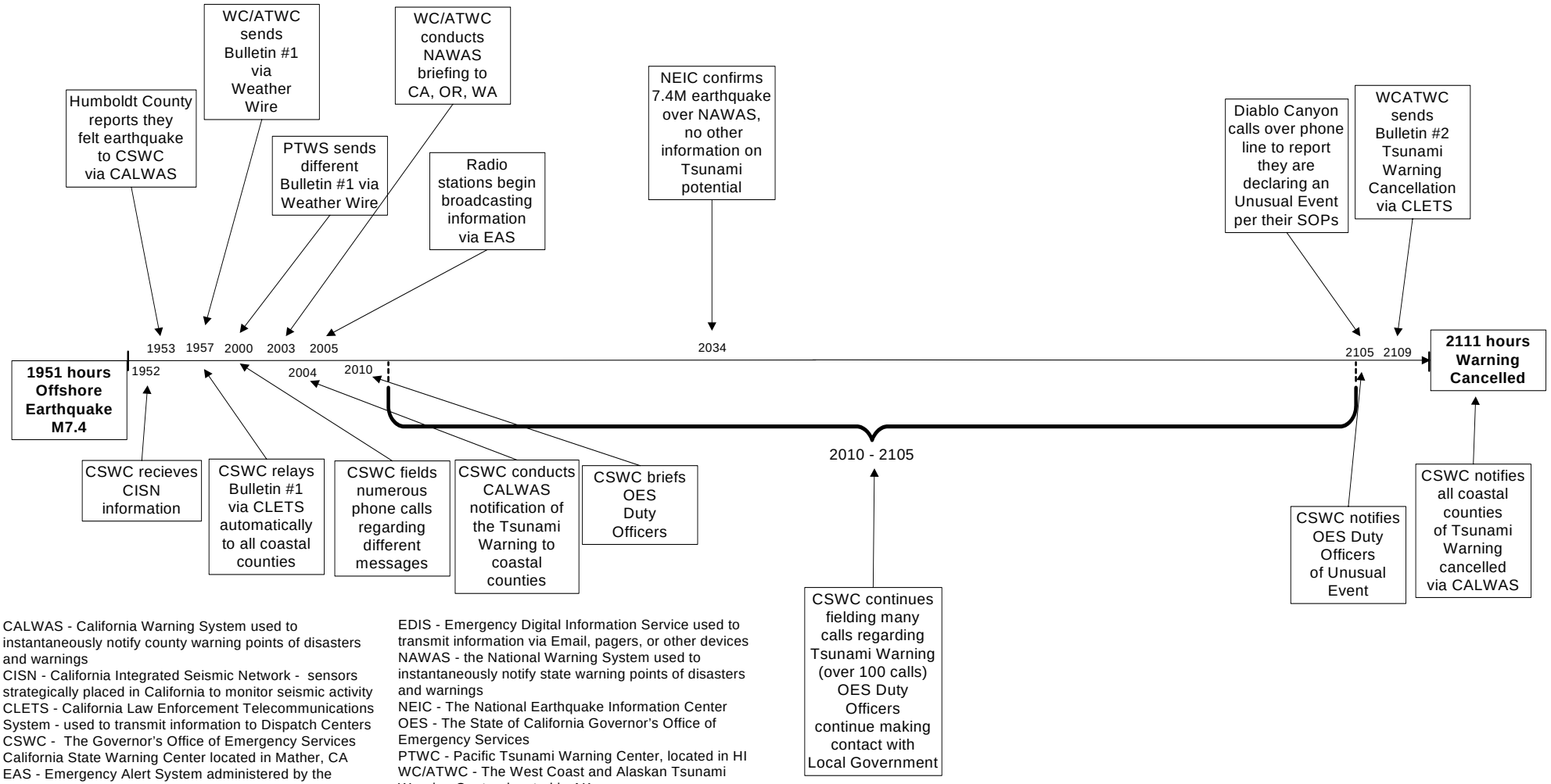
Attachment 2: Magnitude and Moment Magnitude

The first M reading is referred to as the "Preliminary Magnitude" and was M 7.4. It is the first estimate from reading the amplitude off the seismograph. This may also be referred to as "Local" or "Richter" Magnitudes. It is quick but not accurate for earthquakes bigger than about M 6.0. For larger events, M goes nonlinear and a better description of the amount of energy released is calculated as described below.

This initial estimate is then refined by seismologists by measuring the size of the area that has moved on the fault plane, by calculating the length of the rupture and the depth of the rupture. They then produce a Moment Magnitude (Mw), that in the case of the Gorda Plate Earthquake was definitively set at Mw 7.2. UC Berkeley's first calculation of Mw at 7.1 was available at 7:47(minutes:seconds) after the quake and the National Earthquake Information Center’s Mw of 7.0 was available at 29:29 (minutes:seconds) after the quake.

Attachment 3: Timeline

Tsunami Warning Timeline - June 14, 2005



CALWAS - California Warning System used to instantaneously notify county warning points of disasters and warnings
CISN - California Integrated Seismic Network - sensors strategically placed in California to monitor seismic activity
CLETS - California Law Enforcement Telecommunications System - used to transmit information to Dispatch Centers
CSWC - The Governor's Office of Emergency Services California State Warning Center located in Mather, CA
EAS - Emergency Alert System administered by the Federal Government

EDIS - Emergency Digital Information Service used to transmit information via Email, pagers, or other devices
NAWAS - the National Warning System used to instantaneously notify state warning points of disasters and warnings
NEIC - The National Earthquake Information Center
OES - The State of California Governor's Office of Emergency Services
PTWC - Pacific Tsunami Warning Center, located in HI
WC/ATWC - The West Coast and Alaskan Tsunami Warning Center, located in AK

Attachment 4: Tsunami Warning—Bulletin #1 from West Coast and Alaska Tsunami Warning Center

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WEPA41 PAAQ 150256
TSUWCA

TO      - TSUNAMI WARNING SYSTEM PARTICIPANTS IN
          ALASKA/BRITISH COLUMBIA/WASHINGTON/OREGON/CALIFORNIA
FROM    - WEST COAST AND ALASKA TSUNAMI WARNING CENTER/NOAA/NWS
SUBJECT - TSUNAMI WARNING BULLETIN - INITIAL
BULLETIN NUMBER 1
ISSUED 06/15/2005 AT 0256 UTC

...A TSUNAMI WARNING IS IN EFFECT FOR THE COASTAL AREAS
   FROM THE CALIFORNIA-MEXICO BORDER TO THE NORTH TIP OF
   VANCOUVER I.-BC. INCLUSIVE...

...A TSUNAMI WATCH IS IN EFFECT FOR THE COASTAL AREAS FROM
   THE NORTH TIP OF VANCOUVER I.-BC. TO SITKA-AK...

...AT THIS TIME THIS BULLETIN IS FOR INFORMATION ONLY FOR
   OTHER AREAS OF ALASKA...

EARTHQUAKE DATA
 PRELIMINARY MAGNITUDE - 7.4
 LOCATION -  41.3N  125.7W -  90 MILES NW OF EUREKA-CA.
                             300 MILES NW OF SAN FRANCISCO-CA.
 TIME     - 1851 ADT 06/14/2005
            1951 PDT 06/14/2005
            0251 UTC 06/15/2005

EVALUATION
 IT IS NOT KNOWN - REPEAT NOT KNOWN - IF A TSUNAMI EXISTS BUT A
 TSUNAMI MAY HAVE BEEN GENERATED.  THEREFORE PERSONS IN LOW
 LYING COASTAL AREAS SHOULD BE ALERT TO INSTRUCTIONS FROM THEIR
 LOCAL EMERGENCY OFFICIALS. PERSONS ON THE BEACH SHOULD MOVE TO
 HIGHER GROUND IF IN A WARNED AREA. TSUNAMIS MAY BE A SERIES OF
 WAVES WHICH COULD BE DANGEROUS FOR SEVERAL HOURS AFTER THE
 INITIAL WAVE ARRIVAL.

$$
PZZ130-131-133-134-132-135-150-153-156-110-250-210-255-350-
353-356-450-455-550-530-535-555-670-673-650-655-750-WAZ001-
002-005-006-007-008-009-010-011-013-014-015-016-021-ORZ001-
002-021-022-CAZ001-002-005-007-006-075-074-009-034-035-039-
040-046-041-042-043-150456-
COASTAL AREAS FROM THE CALIFORNIA-MEXICO BORDER TO THE
NORTH TIP OF VANCOUVER I.-BC. INCLUSIVE.

...A TSUNAMI WARNING IS IN EFFECT FOR THE COASTAL AREAS
   FROM THE CALIFORNIA-MEXICO BORDER TO THE NORTH TIP OF
   VANCOUVER I.-BC. INCLUSIVE...

ESTIMATED TIMES OF INITIAL WAVE ARRIVAL
CRESCENT CITY-CA 2029 PDT JUN 14   ASTORIA-OR       2154 PDT JUN 14
```

```
CHARLESTON-OR    2044 PDT JUN 14   TOFINO-BC        2157 PDT JUN 14
SAN FRANCISCO-CA 2123 PDT JUN 14   SAN PEDRO-CA     2200 PDT JUN 14
SEASIDE-OR       2126 PDT JUN 14   LA JOLLA-CA      2214 PDT JUN 14
NEAH BAY-WA      2148 PDT JUN 14
$$
PKZ032-031-042-034-033-035-041-036-AKZ023-024-025-026-028-
029-027-150456-
COASTAL AREAS FROM THE NORTH TIP OF VANCOUVER I.-BC. TO
SITKA-AK.

...A TSUNAMI WATCH IS IN EFFECT FOR THE COASTAL AREAS FROM
   THE NORTH TIP OF VANCOUVER I.-BC. TO SITKA-AK...

ESTIMATED TIMES OF INITIAL WAVE ARRIVAL
LANGARA-BC       2244 PDT JUN 14   KETCHIKAN-AK     2257 ADT JUN 14
SITKA-AK         2227 ADT JUN 14
$$
PKZ176-175-172-170-171-155-150-132-136-138-137-130-141-140-
120-121-129-127-125-126-128-052-051-053-022-012-043-013-
011-021-AKZ191-185-181-171-145-111-101-121-125-131-135-017-
020-018-019-021-022-150456-
COASTAL AREAS FROM SITKA-AK. TO ATTU-AK.

...TSUNAMI INFORMATION STATEMENT...

NO - REPEAT NO - TSUNAMI WATCH OR WARNING IS IN EFFECT FOR
   THE COASTAL AREAS FROM SITKA-AK. TO ATTU-AK.

FOR INFORMATION ONLY - ESTIMATED TIMES OF INITIAL WAVE ARRIVAL
YAKUTAT-AK       2317 ADT JUN 14   CORDOVA-AK       0007 ADT JUN 15
KODIAK-AK        2332 ADT JUN 14   DUTCH HARBOR-AK  0013 ADT JUN 15
JUNEAU-AK        2334 ADT JUN 14   COLD BAY-AK      0034 ADT JUN 15
SEWARD-AK        2339 ADT JUN 14   ADAK-AK          0038 ADT JUN 15
VALDEZ-AK        2357 ADT JUN 14   HOMER-AK         0044 ADT JUN 15
SAND PT.-AK      2358 ADT JUN 14   SHEMYA-AK        0119 ADT JUN 15
$$

THE PACIFIC TSUNAMI WARNING CENTER AT EWA BEACH HAWAII WILL
ISSUE BULLETINS FOR OTHER AREAS OF THE PACIFIC.

BULLETINS WILL BE ISSUED HOURLY OR SOONER IF CONDITIONS
WARRANT. THE TSUNAMI WATCH/WARNING WILL REMAIN IN EFFECT
UNTIL FURTHER NOTICE. REFER TO THE INTERNET SITE
WCATWC.ARH.NOAA.GOV FOR MORE INFORMATION AND ETA SITES.
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Attachment 5: Bulletin #1 from Pacific Tsunami Warning Center

TSUNAMI BULLETIN NUMBER 001
PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 0259Z 15 JUN 2005

THIS BULLETIN IS FOR ALL AREAS OF THE PACIFIC BASIN EXCEPT
ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

... TSUNAMI INFORMATION BULLETIN ...

THIS MESSAGE IS FOR INFORMATION ONLY. THERE IS NO TSUNAMI WARNING
OR WATCH IN EFFECT.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS

ORIGIN TIME - 0251Z 15 JUN 2005
COORDINATES - 41.3 NORTH 125.7 WEST
LOCATION - OFF COAST OF NORTHERN CALIFORNIA
MAGNITUDE - 7.4

EVALUATION

NO DESTRUCTIVE PACIFIC-WIDE TSUNAMI THREAT EXISTS BASED ON
HISTORICAL EARTHQUAKE AND TSUNAMI DATA.

HOWEVER - EARTHQUAKES OF THIS SIZE SOMETIMES GENERATE LOCAL
TSUNAMIS THAT CAN BE DESTRUCTIVE ALONG COASTS LOCATED WITHIN
A HUNDRED KILOMETERS OF THE EARTHQUAKE EPICENTER. AUTHORITIES
IN THE REGION OF THE EPICENTER SHOULD BE AWARE OF THIS
POSSIBILITY AND TAKE APPROPRIATE ACTION.

THIS WILL BE THE ONLY BULLETIN ISSUED FOR THIS EVENT UNLESS
ADDITIONAL INFORMATION BECOMES AVAILABLE.

THE WEST COAST/ALASKA TSUNAMI WARNING CENTER WILL ISSUE BULLETINS
FOR ALASKA - BRITISH COLUMBIA - WASHINGTON - OREGON - CALIFORNIA.

Attachment 6: Tsunami Warning Cancelled -- Bulletin #2 from West Coast and Alaska Tsunami Warning Center

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 WEPA41 PAAQ 150409
TSUWCA

TO      - TSUNAMI WARNING SYSTEM PARTICIPANTS IN
          ALASKA/BRITISH COLUMBIA/WASHINGTON/OREGON/CALIFORNIA
FROM    - WEST COAST AND ALASKA TSUNAMI WARNING CENTER/NOAA/NWS
SUBJECT - TSUNAMI WARNING BULLETIN - FINAL (CORRECTED COPY)
BULLETIN NUMBER 2
ISSUED 06/15/2005 AT 0409 UTC

...THE TSUNAMI WARNING AND WATCH STATUS IS CANCELED FOR
   CALIFORNIA - OREGON - WASHINGTON - BRITISH COLUMBIA -  AND
   ALASKA...

EARTHQUAKE DATA
 PRELIMINARY MAGNITUDE - 7.4
 LOCATION -  41.4N  125.6W -  85 MILES NW OF EUREKA-CA.
                             300 MILES NW OF SAN FRANCISCO-CA.
 TIME     - 1851 ADT 06/14/2005
            1951 PDT 06/14/2005
            0251 UTC 06/15/2005


 WATER LEVELS REMAIN NORMAL AT ALL COASTAL SITES.
 NO WAVE HAS BEEN DETECTED.

EVALUATION
 NO TSUNAMI DANGER EXISTS FOR ALASKA - BRITISH COLUMBIA -
 WASHINGTON - OREGON OR CALIFORNIA. HOWEVER SOME AREAS MAY
 EXPERIENCE SMALL SEA LEVEL CHANGES. AS LOCAL CONDITIONS
 CAN CAUSE A WIDE VARIATION IN TSUNAMI WAVE ACTION THE ALL
 CLEAR DETERMINATIONS MUST BE MADE BY LOCAL AUTHORITIES.

$$
PKZ032-031-042-034-033-035-041-036-PZZ130-131-133-134-132-
135-150-153-156-110-250-210-255-350-353-356-450-455-550-
530-535-555-670-673-650-655-750-AKZ023-024-025-026-028-029-
027-WAZ001-002-005-006-007-008-009-010-011-013-014-015-016-
021-ORZ001-002-021-022-CAZ001-002-005-007-006-075-074-009-
034-035-039-040-046-041-042-043-150549-
COASTAL AREAS OF CALIFORNIA - OREGON - WASHINGTON - BRITISH
COLUMBIA -  AND ALASKA.

...THE TSUNAMI WARNING AND WATCH STATUS IS CANCELED FOR
   CALIFORNIA - OREGON - WASHINGTON - BRITISH COLUMBIA -  AND
   ALASKA...

$$

THE PACIFIC TSUNAMI WARNING CENTER WILL ISSUE A FINAL BULLETIN.

THIS WILL BE THE LAST WEST COAST AND ALASKA TSUNAMI WARNING
```

CENTER WATCH/WARNING BULLETIN ISSUED FOR THIS EVENT.
THIS INFORMATION IS ALSO POSTED AT WCATWC.ARH.NOAA.GOV.
$$

Attachment 7: Background on West Coast and Alaska Tsunami Warning Center and Pacific Tsunami Warning Center

The NOAA National Weather Service operates two tsunamis Warning Centers—one each in Alaska and Hawaii. The WC/ATWC, located in Palmer, Alaska, has the sole responsibility for issuing tsunami warnings to coastal locations of California, Oregon, Washington, British Columbia, and Alaska—its area of responsibility (AOR).

The PTWC provides warnings to most countries in the Pacific Basin as well as to Hawaii and all other U.S. interests in the Pacific outside of Alaska and the U.S. West Coast. Those areas are served by the WC/ATWC in Palmer, Alaska.

When Are Warnings Issued (per WC/ATWC)

Near the Pacific coasts of Alaska, British Columbia, Washington, Oregon, and California. For initially determined magnitudes greater than 7.0 but less than or equal to 7.5, the WC/ATWC will issue a tsunami warning covering an area within a 2-hour wave travel time from the time of bulletin issuance and a tsunami watch extending one additional hour of wave travel time.

For initially determined magnitudes greater than 7.5, a tsunami warning will be issued covering an area within a 3-hour wave travel time from the time of bulletin issuance and a tsunami watch extending an additional 3-hour wave travel time. Subsequent bulletins will be issued at least hourly until the warning is cancelled or a final warning supplement is issued. All watch and warning areas will be described using the breakpoints shown in section 1.2.5 below.

The WC/ATWC is updating the policy to reflect any changes since the December 2004, event.

What is a tsunami warning?

A tsunami warning indicates that a tsunami may be imminent and that coastal locations in the warned area should prepare for flooding. The initial warning is typically based solely on seismic information. After the tsunami is recorded on sea level gages, the warning will be cancelled, restricted, expanded incrementally, or expanded to cover the entire coast in the event of a major tsunami. Tsunami warnings include estimated wave arrival times for key coastal locations in the warned area.

What is a tsunami watch?

A tsunami watch is an alert issued to areas outside the warned area. The geographical extent of the watch area is based on the size of the earthquake and tsunami travel times throughout the AOR. The watch will either be upgraded to a warning in subsequent bulletins or cancelled depending on the severity of the

tsunami. Tsunami watches include estimated wave arrival times for key coastal locations in the watch area.

It should be noted that the wave travel time is different from evacuation time. In a warning zone, the issuance of the warning is notification to a local official to consider evacuation. In a watch zone, discretion on evacuation decisions remains with local officials.

The WC/ATWC estimates the wave travel time from the origin of the earthquake to specific coastal communities and provides "Estimated Times of Initial Wave Arrival" in their Bulletin Number 1. The Warning Zone includes areas on the coast at which the wave is estimated to arrive within two (2) hours. Local government officials must make the decision on whether to evacuate their community based on their assessment of the risk.

Tsunami estimated time of arrival will be disseminated for the tide stations within the Tsunami Watch and Warning areas. Additional bulletins are issued by the Warning Centers at hourly intervals until the advisories are either canceled or the existence of a damaging tsunami is confirmed. The information is transmitted to the CSWC.

OFFICE OF THE DIRECTOR
GOVERNOR'S OFFICE OF EMERGENCY SERVICES
3650 SCHRIEVER AVENUE
MATHER, CALIFORNIA 95655
(916) 845-8510
FAX: 845-8511

June 27, 2005
Attachment 8: 1/19/05 Letter to Senator Feinstein

January 19, 2005

The Honorable Dianne Feinstein
United States Senate
331 Hart Senate Office Building
Constitution Avenue & 2nd St NE
Washington, DC 20510

Dear Senator Feinstein:

Thank you for your interest in tsunami preparedness in the state. The tragic events in Southern Asia are a reminder of the devastation that nature can bring, and what we must do to best protect our citizens. My staff spoke with your representative, Mr. Trevor Dailey, and I understand that you would like to seek additional funding to support tsunami preparedness in California. The following information may assist you in this matter.

Based on what we have learned from the recent catastrophe in South Asia, California estimates that approximately $27 million is needed over the next five years to enhance tsunami preparedness in our state. This funding would be utilized by state agencies and local governments within the 15 California coastal counties to expedite the completion of the activities described in the enclosed Estimate of Tsunami Preparedness Needs in California.

The National Oceanic and Atmospheric Administration (NOAA) currently funds the tsunami program in California. However, the funding provided to our state has not been sufficient to address our needs as the funding is shared by NOAA, the Federal Emergency Management Agency (FEMA), the U.S. Geological Survey (USGS), and the states of California, Oregon, Washington, Hawaii, Alaska, and Puerto Rico. It is my understanding that NOAA and USGS are proposing to increase their funding to provide early warning to the entire Pacific basin. State and local programs in the U.S. would receive significant benefits from the proposed enhancements to the national Tsunami Warning System. Expansion of NOAA's Deep Ocean Assessment and Reporting of Tsunamis (DART) system and coastal tide gage network would provide additional data to support time critical tsunami alert and warning in the Pacific basin.

OES believes that your support of California's needs and NOAA/USGS' enhancement proposal would benefit not only California citizens, but also the populations of the entire Pacific basin.

If you have any questions or need additional information, please contact me or Grace Koch, Deputy Director, at (916) 845-8510. I look forward to working with you and your staff on this very important issue and appreciate your continued support of the state's emergency management operations.

Sincerely,

Original signed by
Henry R. Renteria

HENRY R. RENTERIA
Director

Enclosure

Estimate of Tsunami Preparedness Needs in California

State Agency Activities:

Approximately $19.5 million over the next five years is needed to enhance the state's preparedness as outlined below:

> Mapping: Two (2) Personnel Years (PYs) for the California Geological Survey (CGS) to complete and speed the delivery of inundation maps to local governments ($500,000 per year for 5 years).
>
> Planning: One (1) PY in each of three Governor's Office of Emergency Services (OES) regional offices to support local government evacuation planning ($200,000 per year for 5 years).
>
> Warning: One (1) PY for the OES Warning Center to support statewide notification/paging of coastal emergency managers to city level ($200,000 per year for 5 years for technology and personnel).
>
> Installation of coastal warning sirens with voice capability ($3,000,000 per year for 5 years). Installations would be in coastal communities based on at-risk populations.

Local Government Activities:

Approximately $7.5 million to local governmental agencies within the 15 California coastal counties (approximately $500,000 per county) for the associated local planning costs and other activities, including signage and maintenance, public education campaigns to ensure the awareness of potentially impacted residents, etc.